

Amendment and Response

Applicant: Irwin Aberin et al.

Serial No.: 10/588,927

Filed: August 3, 2007

Docket No.: I431.168.101/FIN581PCT/US

Title: SEMICONDUCTOR PACKAGE WITH PERFORATED SUBSTRATE

REMARKS

The following remarks are made in response to the Non-Final Office Action mailed February 2, 2010. Claims 1-16, 18, 26 and 35 have previously been cancelled without prejudice. Claims 17, 19-25, 27-34 and 36 were rejected. Claims 17, 19-25, 27-34, and 36 were objected to. With this Response, claims 17, 22, 24, 30, and 33 have been amended. Claims 17, 19-25, 27-34, and 36 remain pending in the application and are presented for reconsideration and allowance.

Claim Objections

Claims 17, 19-25, 27-34 and 36 were objected to due for informalities.

With this Response, claims 17, 22, 24, 30, and 33 were amended as suggested by the Examiner so as to correct the identified informalities. As such, Applicants respectfully request that the objections to claims 17, 19-25, 27-34 and 36 be withdrawn.

Claim Rejections under 35 U.S.C. § 103

Claims 17, 19, 24, 25, 27-34 and 36 were rejected under 35 U.S.C. 103(a) as being unpatentable over Patent No. US Patent No. 6,014,318 to Takeda ("Takeda") in view of US Patent No. US 6,054,755 to Takamichi et al. ("Takamichi").

Claims 20 and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Takeda and Takamichi in further view of US Patent Publication No. 2001/0042908 to Okada et al. ("Okada").

Claims 22 and 23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Takeda and Takamichi in further view of US Publication No. 2002/0043721 to Weber et al. ("Weber").

Applicants respectfully submit that neither Takeda nor Takamichi, either alone or in combination, teach or suggest the method of amended independent claim 17.

Takeda, with reference to Figure 11, teaches that vent holes 7 are disposed only in areas which are around a perimeter of semiconductor chip 2 and not within a semiconductor chip

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mounting area defined by semiconductor chip 2 (i.e. the area directly underneath semiconductor chip 2. In contrast, amended independent claim 17 clarifies that **non-vented plate holes are formed both in areas outside of the semiconductor chip mounting area and within the semiconductor chip mounting area.** As described by the present application, such an arrangement on non-plated vent holes enables moisture to escape from the core material of a substrate (e.g. a printed circuit board) over the entire area of the substrate. As described above, Takeda describes positioning vent holes only outside of the semiconductor mounting area and not directly below semiconductor chip 2 and, as such, does not provide for such moisture escape over the entire area of the substrate.

Takamichi was relied upon by the Office Action only for its method of covering an upper surface of a substrate with a layer of solder resist.

In view of the above, Applicants submit that neither Takeda nor Takamichi, either alone or in combination, teach or suggest that **forming non-plated vent holes both in areas outside of a semiconductor chip mounting area and within the semiconductor chip mounting area,** as defined by amended independent claim 17. As such, Applicants respectfully request that the rejection of amended independent claim 17 under 35 U.S.C. 103 over Takeda in view of Takamichi be withdrawn and that amended independent claim 17 be allowed.

Independent claims 24, 30, and 33 have each been amended so as to include limitations similar to those described above with respect to amended independent claim 17. As such, for at least the reason described above with respect to the allowability of amended independent claim 17, Applicants respectfully request that the rejections of amended 24, 30, and 33 under 35 U.S.C. 103 over Takeda in view of Takamichi also be withdrawn and that amended independent claims 24, 30, and 33 be allowed as well.

With respect to independent claim 22, independent claim 22 has been amended to clarify that **non-plated vent holes are disposed in both an area of the substrate directly underneath the semiconductor chip and in areas adjacent to but not directly underneath the semiconductor chip.** As described above with respect to amended independent claim 17, neither Takeda nor Takamichi, either alone or in combination, teach or suggest such limitations.

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Weber was relied upon by the Office Action only for its teachings with respect to performing a solder reflow.

In view of the above, Applicants submit that neither Takeda, Takamichi, nor Weber, either alone or in combination, teach or suggest that **non-plated vent holes are disposed in both an area of the substrate directly underneath the semiconductor chip and in areas adjacent to but not directly underneath the semiconductor chip**, as defined by the method amended independent claim 22. As such, Applicants respectfully request that the rejection of amended independent claim 22 under 35 U.S.C. 103 over Takeda and Takamichi in view of Weber be withdrawn and that amended independent claim 22 be allowed.

Since claims 19-21 depend from and further define patentably distinct amended independent claim 17, claim 23 depends from and further defines patentably distinct amended independent claim 22, claims 25 and 27-29 depend from and further define patentably distinct amended independent claim 24, claims 31 and 32 depend from and further define patentably distinct amended independent claim 30, and claims 34 and 36 depend from and further define patentably distinct amended independent claim 33, Applicants respectfully request that the rejections of dependent claims 19-21, 23, 25, 27-29, 31, 32, 34, and 36 under 35 U.S.C. 103 also be withdrawn and that dependent claims 19-21, 23, 25, 27-29, 31, 32, 34, and 36 be allowed as well.

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CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 17, 19-25, 27-34, and 36 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 17, 19-25, 27-34, and 36 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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